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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/001,802	12/05/2001	Erik Y. Trel	11028-0002	2804
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CLARK & BRODY 1090 VERMONT AVENUE, NW SUITE 250 WASHINGTON, DC 20005			EXAMINER PROCTOR, JASON SCOTT	
			ART UNIT 2123	PAPER NUMBER
			MAIL DATE 12/17/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

**Office Action Summary**

Application No.

10/001,802

Applicant(s)

TRELL, ERIK Y.

Examiner

Jason Proctor

Art Unit

2123

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 16 October 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 11-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 11-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

Claims 7-14 were rejected in the Office Action entered on 26 April 2007.

Applicants' submission on 16 October 2007 has cancelled claims 7-10 and amended claim 11. Claims 11-14 are pending in this application.

Claims 11-14 are rejected.

Applicants are notified that the Examiner of record has changed.

#### ***Response to Arguments – 35 USC § 101***

1. In response to the rejection of claims 11-14 under 35 U.S.C. § 101, Applicants argue primarily that:

Reconsideration of the rejection of claims 11-14 under 35 USC § 101 in light of the amendments to claim 11 wherein the concrete tangible result of providing a model is recited.

The Examiner respectfully traverses this argument as follows.

The model described by the claims is an abstract concept defined by numbers and mathematical functions. Claim language that recites "providing the model" is similar to "providing the idea" because the claimed model and an idea are both abstractions that lack any tangible embodiment. Therefore, the amendments to claim 11 do not overcome the previous grounds of rejection and do not establish a useful, concrete, and tangible result of the method.

Applicants' arguments have been fully considered but have been found unpersuasive.

#### ***Response to Arguments - 35 USC § 112***

2. In response to the rejection of claim 14 under 35 U.S.C. § 112, Applicants argue primarily that:

It is submitted that one of ordinary skill would know how to make a holographic representation of the model of claim 11.

The Examiner respectfully traverses this argument as follows.

The arguments of counsel cannot take the place of evidence in the record. MPEP 2145.

It is the specification, not the knowledge of one skilled in the art, that must supply the novel aspects of an invention in order to constitute adequate enablement. It is unclear whether Applicants' intention is to admit that holographic representations of the type of model being claimed are well known in the art.

Applicants' arguments have been fully considered but have been found unpersuasive.

### ***Response to Arguments – 35 USC § 103***

3. In response to the rejection of claims 11-14 under 35 U.S.C. § 103, Applicants argue primarily that:

It is submitted that there is no reason to combine the references to obtain the claimed invention.

The Examiner respectfully traverses this argument as follows.

The arguments of counsel cannot take the place of evidence in the record. MPEP 2145.

The previous rejection set forth motivation for combining the teachings of the references.

Specifically, the previous rejection stated in relevant part:

Accordingly, a skilled tasked with realizing a method and apparatus for producing a model of an elementary particle, and having access to the teachings of Bogoliubov and applicants admitted prior art, would have knowingly modified the teachings of Bogoliubov with the admitted prior art to realized the elements of the present invention as presently claimed. An obvious motivation exists since, as recognized in applicants admitted prior art, it has already been established that coset decomposition algebra can be projected in real geometry. (See: page 5, last paragraph, Kleppner and Jackow)

Hence, a skilled artisan would have further known to modify the teachings of Boboliebov and AOA with the teachings of IRIS Explorer as a method of providing a visual representation of the elementary particle model using the same reasoning previously set forth above.

Applicants' arguments have been fully considered but have been found unpersuasive.

### ***Drawings***

4. The previous objection to the drawings is withdrawn in response to the cancellation of claims 7-10.

### ***Information Disclosure Statement***

5. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609.04(a) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

Specifically, the specification makes reference to numerous publications throughout the specification (See: specification page. 8, "Jaffe (Nature, Vo. 268, p. 201, 1977", "(G. Rosner, Science, Vol. 290, 2000, p 2083)", for example) that have not been properly included in an IDS.

*Claim Rejections - 35 USC § 101*

6. The previous rejection of claims 7-10 under 35 U.S.C. § 101 is withdrawn in response to the cancellation of those claims.

35 U.S.C. § 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4. Claims 11-14 are rejected under 35 U.S.C. § 101 because the claimed invention is drawn to non-statutory subject matter.

Per claims 11-14: The Examiner first submits that, in view of the language of the claims, independent claim 11 is abstract and does not appear to recite a concrete and tangible result. In this case the result appears to merely be an abstract set of mathematical relationships (calculations) that are not used to achieve the intended application of producing or constructing a model of an elementary particle. In claim 11 the result appears to simply be a numerically represented beam using root space vectors (e.g. numbers). The examiner submits that in order to establish a practical application, there must be either a physical transformation, or a useful, concrete and tangible result. Data transformation is not the same as a physical transformation. In this instance, there does not appear to be a concrete and tangible result. Here, the recited method steps appear to simply amount to mathematical calculations describing root space vectors, and not a physical transformation. The claimed elements in this case, are simply a thought or computation, and not in and of themselves a tangible result. It is not until the transformation of the results of the claimed representations of beams from the root space vectors are applied in a

meaningful way that it has real world value and becomes a tangible result. Instead, the result appears to simply be an unapplied and un-stored number resulting from the Lie Algebra coset decomposition.

MPEP 2106 recites the following:

"A. Identify and Understand Any Practical Application Asserted for the Invention  
The claimed invention as a whole must accomplish a practical application. That is, it must produce a "useful, concrete and **tangible result**." State Street, 149 F.3d at 1373, 47 USPQ2d at 1601-02. The purpose of this requirement is to limit patent protection to inventions that possess a certain level of "**real world**" value, as opposed to subject matter that represents nothing more than an idea or concept, or is simply a starting point for future investigation or research (Brenner v. Manson, 383 U.S. 519, 528-36, 148 USPQ 689, 693-96); In re Ziegler, 992, F.2d 1197, 1200-03, 26 USPQ2d 1600, 1603-06 (Fed. Cir. 1993)). Accordingly, a complete disclosure should contain some indication of the practical application for the claimed invention, i.e., why the applicant believes the claimed invention is useful.

Apart from the utility requirement of 35 U.S.C. 101, usefulness under the patent eligibility standard requires significant functionality to be present to satisfy the useful result aspect of the practical application requirement. See Arrhythmia, 958 F.2d at 1057, 22 USPQ2d at 1036. Merely claiming nonfunctional descriptive material stored in a computer-readable medium does not make the invention eligible for patenting. For example, a claim directed to a word processing file stored on a disk may satisfy the utility requirement of 35 U.S.C. 101 since the information stored may have some "real world" value. However, the mere fact that the claim may satisfy the utility requirement of 35 U.S.C. 101 does not mean that a useful result is achieved under the practical application requirement. The claimed invention as a whole must produce a "useful, concrete and tangible" result to have a practical application.

Although the courts have yet to define the terms useful, concrete, and tangible in the context of the practical application requirement for purposes of these guidelines, the following examples illustrate claimed inventions that have a practical application because they produce useful, concrete, and tangible result:

- Claims drawn to a long-distance telephone billing process containing mathematical algorithms were held to be directed to patentable subject matter because "the claimed process applies the Boolean principle to produce a useful, concrete, **tangible result** without pre-empting other uses of the mathematical principle." AT & T Corp. v. Excel Communications, Inc., 172 F.3d 1352, 1358, 50 USPQ2d 1447, 1452 (Fed. Cir. 1999);
- "[T]ransformation of data, representing discrete dollar amounts, by a machine through a series of mathematical calculations into a final share price, constitutes a practical application of a mathematical algorithm, formula, or calculation, because it produces a useful, concrete and tangible result' -- a final share price momentarily fixed for recording and reporting purposes and even accepted and relied upon by regulatory authorities and in subsequent trades." State Street, 149 F.3d at 1373, 47 USPQ2d at 1601; and
- Claims drawn to a rasterizer for converting discrete waveform data samples into anti-aliased pixel illumination intensity data to be displayed on a display means were held to be directed to patentable subject matter since the claims defined "a specific machine to produce a useful, concrete, and **tangible result**." In re Alappat, 33 F.3d 1526, 1544, 31 USPQ2d 1545, 1557 (Fed. Cir. 1994)."

Dependent claims inherit the defect of the claims from which they depend.

***Claim Rejections - 35 USC § 112***

7. The previous rejections of claims 7-10 under 35 U.S.C. § 112 are withdrawn in response to the cancellation of those claims.

The following is a quotation of the first paragraph of 35 U.S.C. § 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claim 14 is rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The Examiner submits that there appears to be no support in the specification for creating the holographic representations recited in dependent claim 14. Accordingly, for purposes of art rejections the examiner has interpreted this feature to simply be a computer generated graphical representation as would have been well known in the art.

***Claim Rejections - 35 USC § 103***

8. The previous rejection of claims 7-10 under 35 U.S.C. § 103 is withdrawn in response to the cancellation of those claims.



The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 11-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over “Finite-size effects and infrared asymptotics of the correlation function in two dimensions”, Bogoliubov et al, J. Phys. A: Math. Gen. 20, 1987, in view of applicants’ own admission (AOA), and in further view of IRIS Explorer User’s Guide” Release 5.0, The Numerical Algorithms Group, Ltd, 2000.

Regarding claims 11-14, Bogoliubov teaches a creating a model of elementary particles (Section 3, especially page 5365, paragraph 1) that includes ground states represented by filling a Fermi sphere (page 5363, paragraph 1).

Bogoliubov does not explicitly disclose the use of root space vectors and Lie algebra coset decomposition.

However, as admitted by applicants, and disclosed in the specification, the features relating to root space vectors and Lie algebra coset decomposition were well known in the art at the time of the invention. (See: page 5, last paragraph, page 6, paragraph 2 (Science, Rosner, Vol. 290, 200, p 2083), page 7, paragraphs 2-4, page 8, paragraphs 1-3 (Nature, Jaffe, Vol. 268, p 201, 1977), for example)

Accordingly, a skilled tasked with realizing a method and apparatus for producing a model of an elementary particle, and having access to the teachings of Bogoliubov and applicants admitted prior art, would have knowingly modified the teachings of Boboliubov with

the admitted prior art to realized the elements of the present invention as presently claimed. An obvious motivation exists since, as recognized in applicants admitted prior art, it has already been established that coset decomposition algebra can be projected in real geometry. (See: page 5, last paragraph, Kleppner and Jackow)

Boboliebov and AOA do not explicitly disclose a creating graphical representation of the model of elementary particles. (e. g. representing the model of elementary particles in a figurative or physical medium)

IRIS Explorer discloses a commercially available software product capable of providing a visualization of (Section 1.6 to 1.6.2) of particle models (elementary, subatomic, etc.) generated by computer graphics. Hence, a skilled artisan would have further known to modify the teachings of Boboliebov and AOA with the teachings of IRIS Explorer as a method of providing a visual representation of the elementary particle model using the same reasoning previously set forth above. Here the examiner has interpreted a figurative or physical medium to be visual or graphical display of the elementary particles represented by the model.

### ***Conclusion***

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

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will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason Proctor whose telephone number is (571) 272-3713. The examiner can normally be reached on 8:30 am-4:30 pm M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Rodriguez can be reached at (571) 272-3753. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Any inquiry of a general nature or relating to the status of this application should be directed to the TC 2100 Group receptionist: 571-272-2100. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jason Proctor  
Examiner  
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